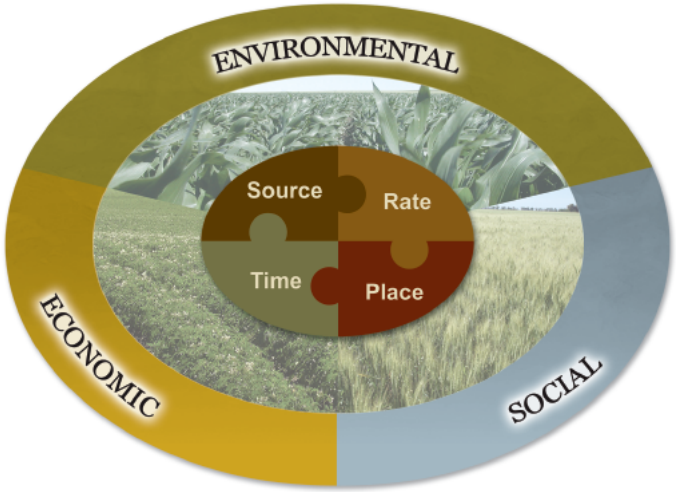

MO-AG
Steve Taylor
Missouri Agribusiness
Association
Water Protection Forum Meeting
July 25, 2012

4R Nutrient Stewardship

- Improve agricultural production while contributing to social well being and minimizing environmental impacts (benefits water and air quality)



- 4R represents the use of fertilizer Best Management Practices to ensure:
  - the right source
  - at the right rate
  - at the right time
  - in the right place

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4 nutrient stewardship

4R Nutrient Stewardship

- Match nutrient supply with crop requirements and to minimize nutrient losses from fields
- BMPs effecting fertilizer Source, Rate, Time, & Place are site specific
  - Practices chosen for a given field are dependent on soil, climate, and management conditions, crop selection, and other site specific factors

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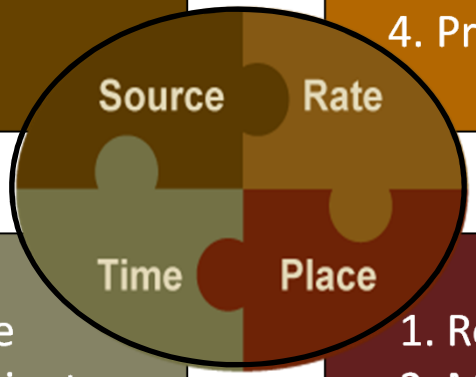
Framework for management systems and education based on basic universal scientific principles

1. Supply in plant available forms
2. Suit soil properties
3. Recognize synergisms among elements
4. Blend compatibility

1. Appropriately assess soil nutrient supply
2. Assess all available indigenous nutrient sources
3. Assess plant demand
4. Predict fertilizer use efficiency



1. Assess timing of crop uptake
2. Assess dynamics of soil nutrient supply
3. Recognize timing of weather factors
4. Evaluate logistics of operations

1. Recognize root-soil dynamics
2. Manage spatial variability
3. Fit needs of tillage system
4. Limit potential off-field transport

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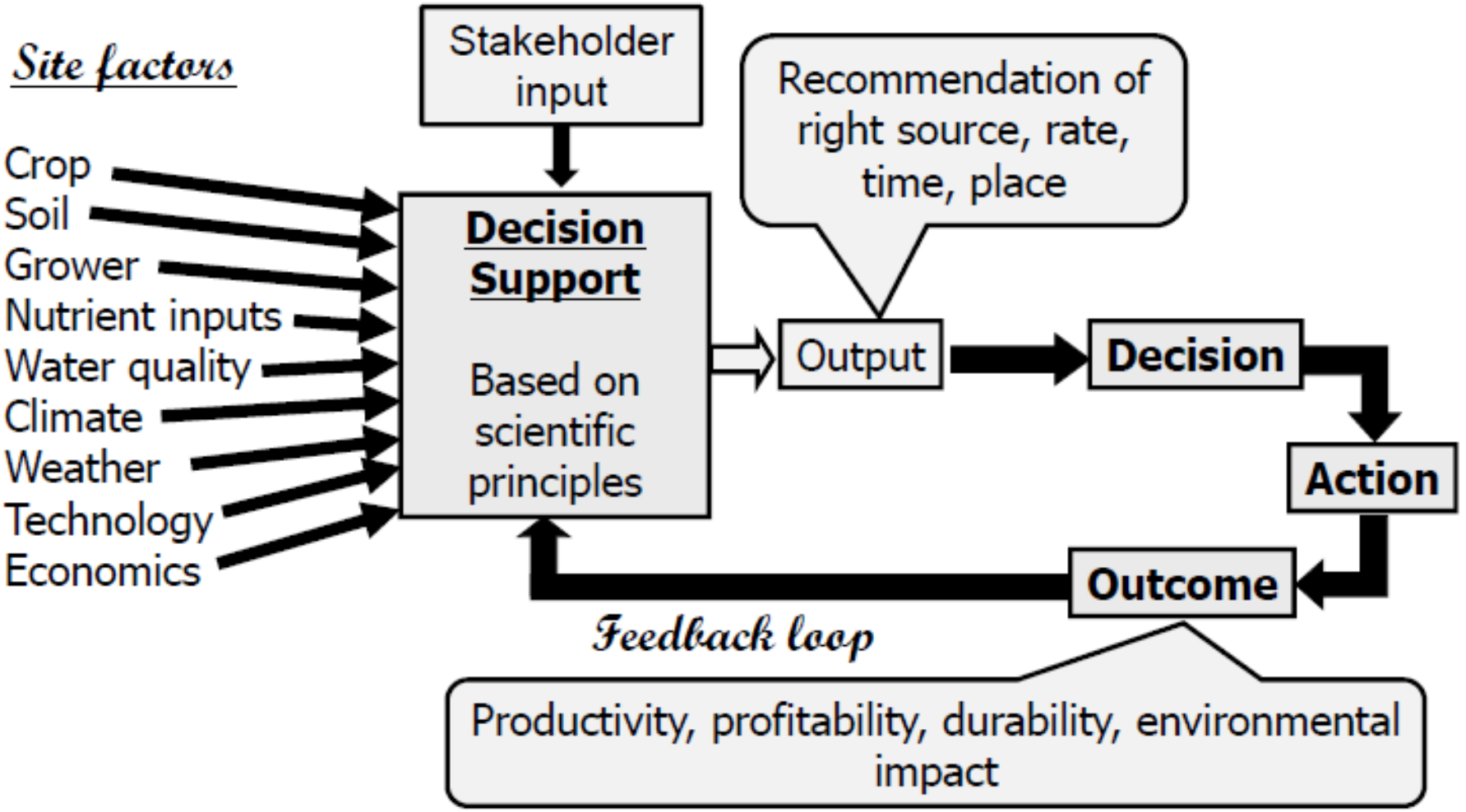
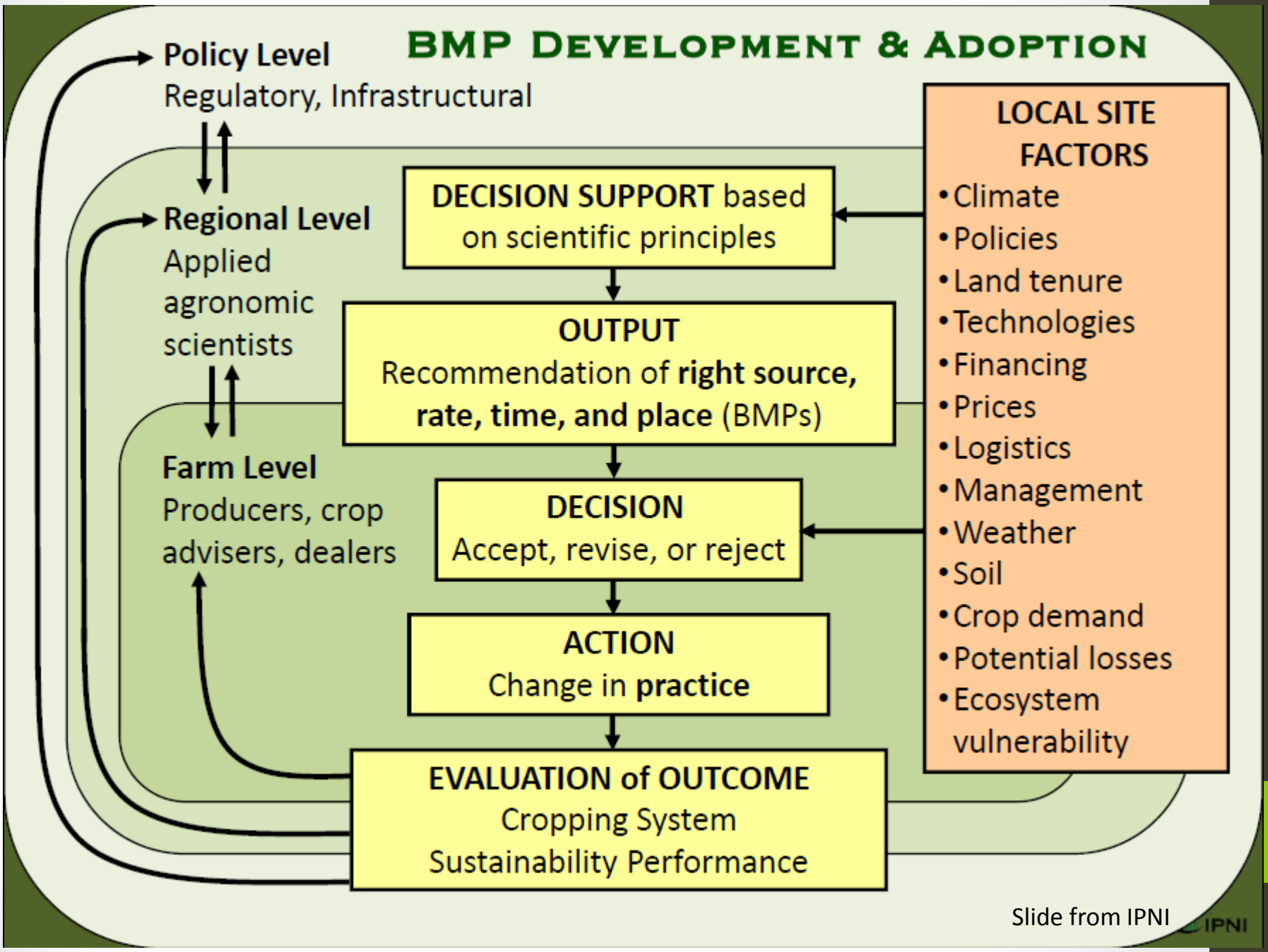
4R nutrient stewardship

The role of adaptive management in practice refinement for 4R Nutrient Stewardship





Slide from IPNI

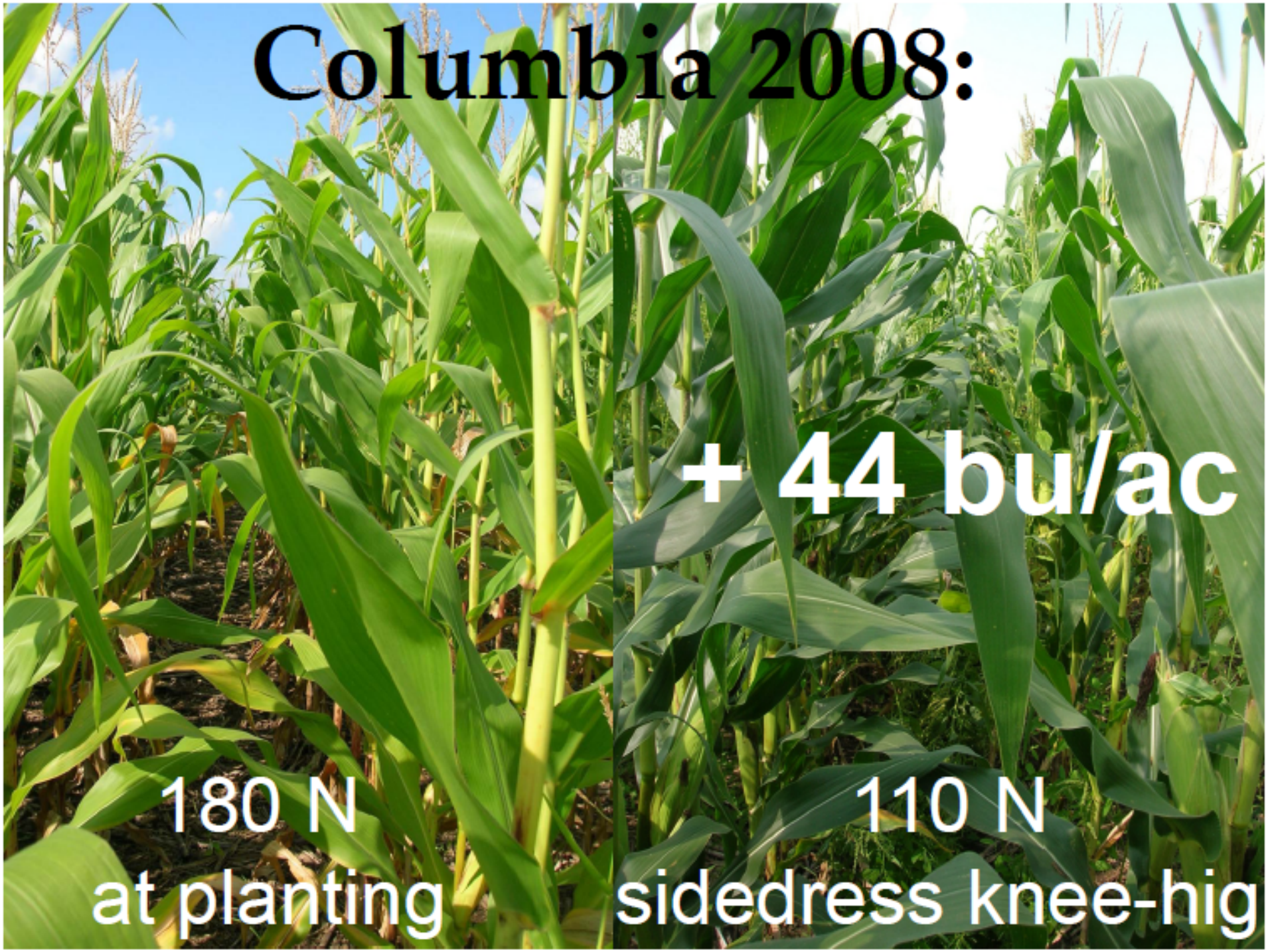
Comparison of EE Urea Products (2009)

4 Rs

Right Source

Right Rate
Right Time
Right Place

Houx and Fritschi, 2010. http://aes.missouri.edu/pfcs/research/prop09.pdf


Columbia 2008:
+ 44 bu/ac
180 N
at planting
110 N
sidedress knee-hig


Enh ming
• App
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• Rat eeds
•
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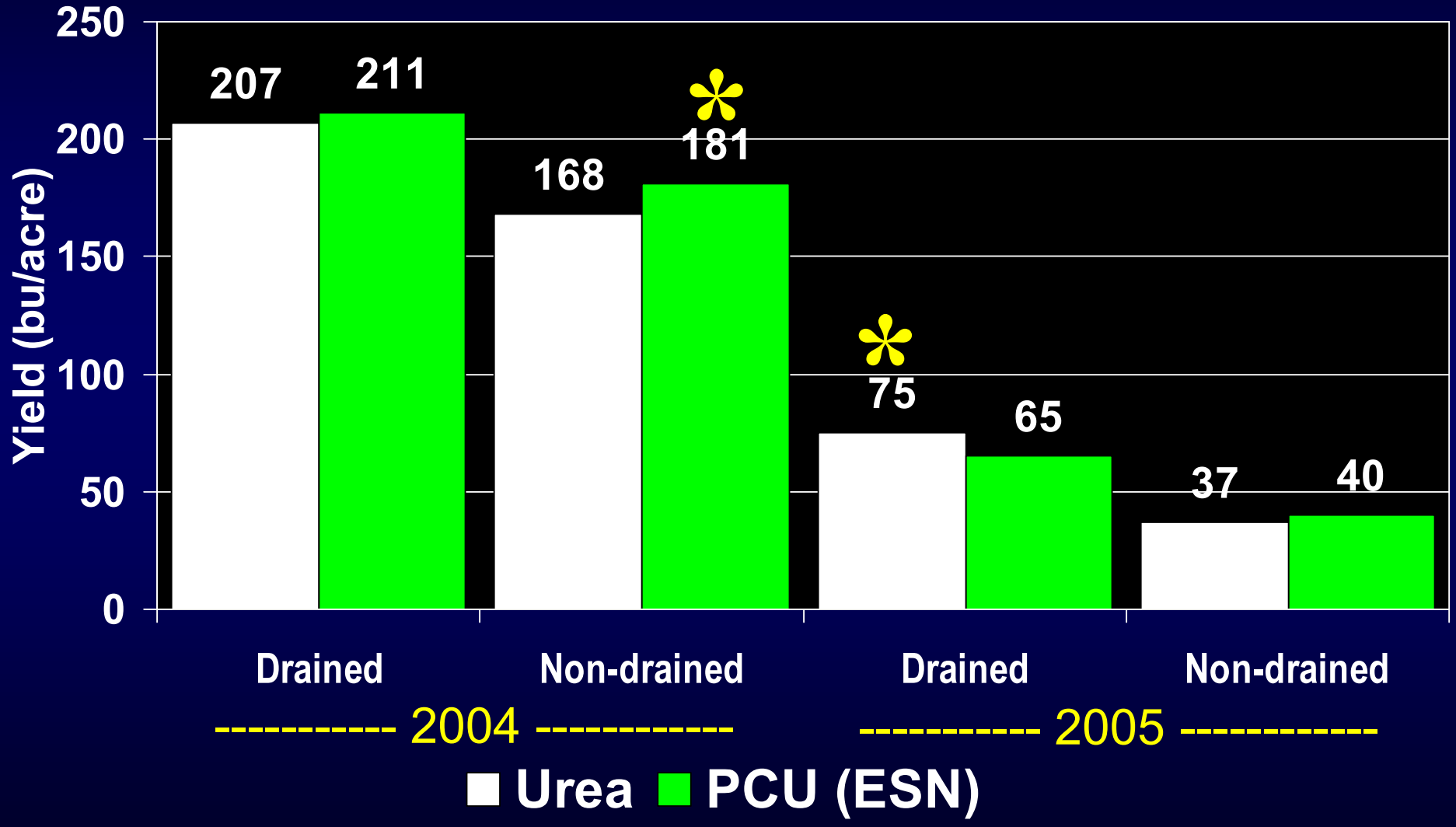
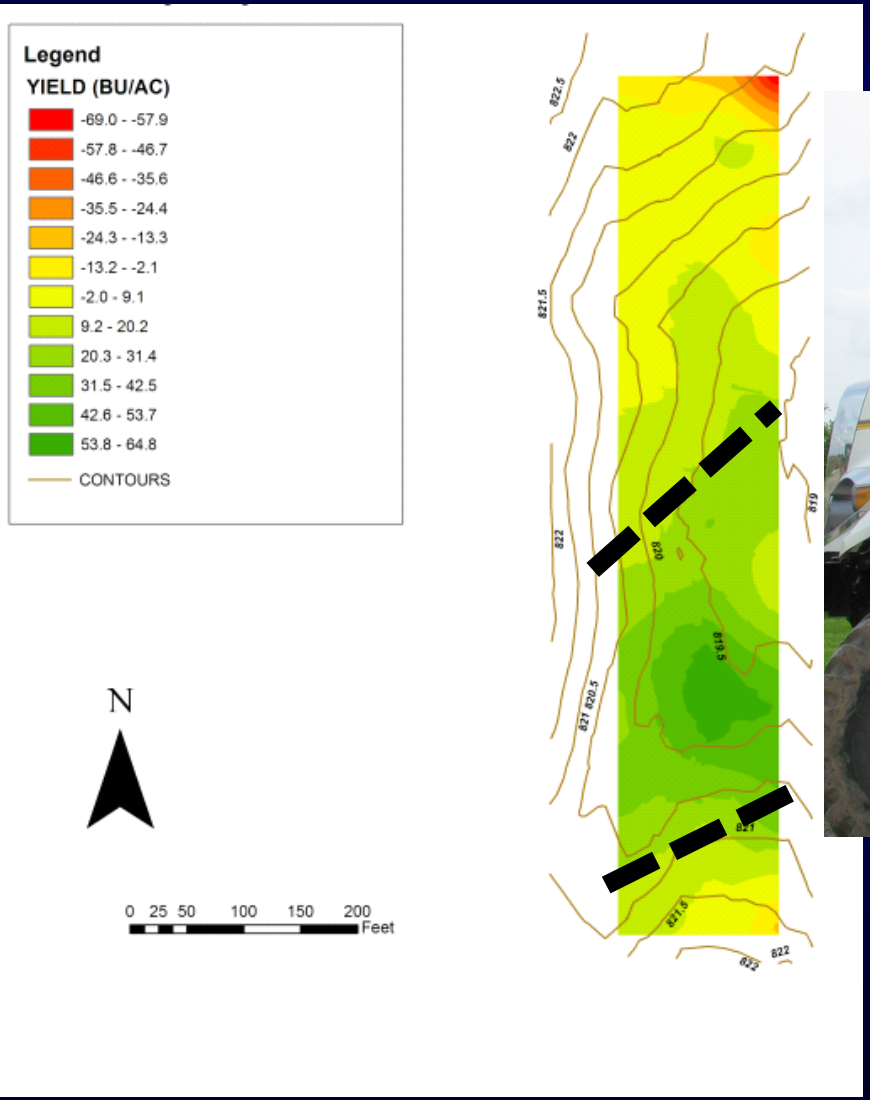
• Cro ing &
ra
4 Rs
Right Source
Right Rate
Right Time
Right Place

Water Management (Medium, Fine Textured Soils)



Nelson et al., 2009. Agron. J.

Variable Source N Applications




WARNING
FALLING HAZARD
To prevent death, serious injury or machine damage:
• Do not stand or climb on guard.
55630-D
WARNING
MOVING PART HAZARD
To prevent death or serious injury:
• Close and secure guards before starting.
• Do not stand or climb on machine.
• Disconnect and lockout power source before adjusting or servicing.
• Keep hands, feet and hair away from moving parts.
55631-C


NEW LEADER
DGPS
Urea - Esn
SYSTEM
RATE
Urea
326
N
FIELD
REGION
Test 3
<1>
RATE
Urea
0.0
lb/ac
AREA
0.00
ac
RATE
Esn
0.0
lb/ac
GROUND
SPEED
0.0
mph
CLEAR
Rx
LAYERS
Data
Reference
Guidance
Markers
Boundary
Grid
MAP
OPTIONS
Zoom Detail
Map Rotation
FIELD BOUNDARY
START
VIEW
APPLICATION
FIELD NOTES
MAP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4 Rs
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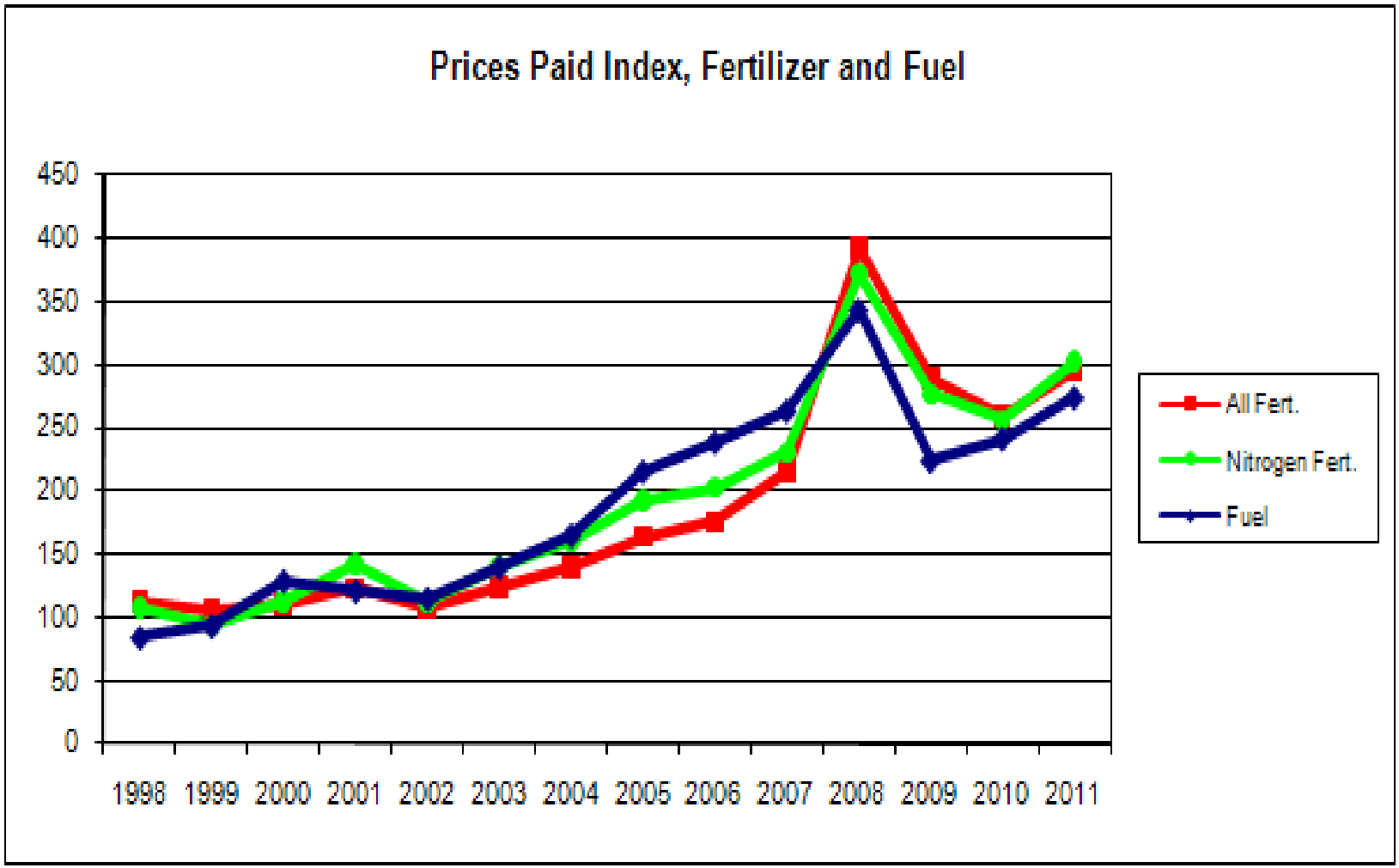
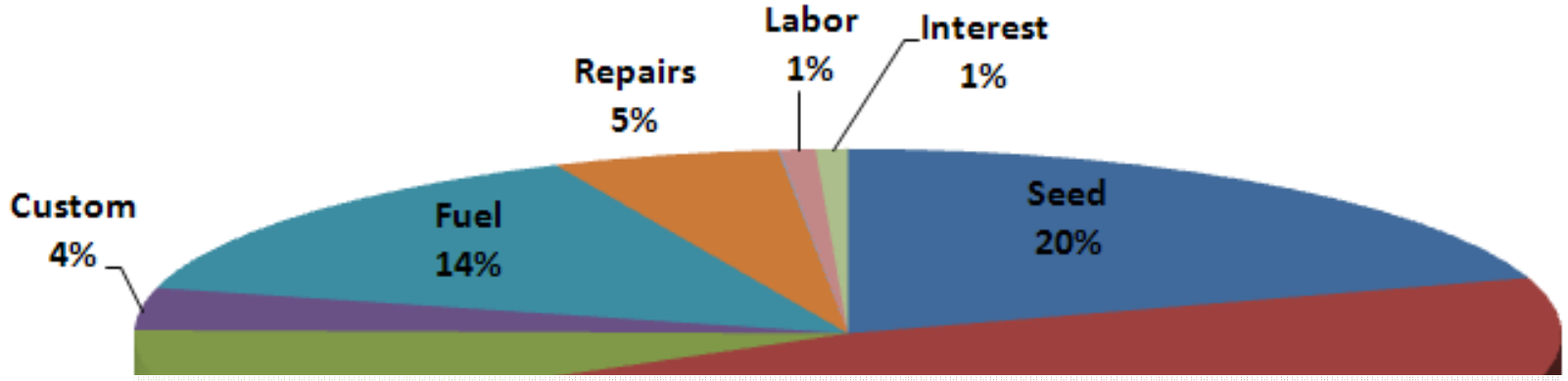


Source: USDA prior to 2009, FAPRI-MU 2009-2011
1990-92=100

US Corn Cost of Production



University of MO 2012 Corn Budget (cost/acre)

	(cost/acre)	(1000 acres)
Fertilizer	**$152.90**	**$152,900**
Machinery overhead & depreciation	**$ 50.69**	**$ 50,290**
Machinery repairs and maintenance	**$ 14.55**	**$ 14,550**
Real estate	**$145.00**	**$145,000**

Variable Cost	298.06	292.75	255.46	277.61
Fertilizer	139.18	137.47	102.33	113.78
Fuel	42.64	27.80	27.88	29.99

States Supporting 4R Program

- **Illinois Fertilizer and Chemical Association – Passed HB 5539**
  - Overall goal – Adoption of 4R nutrient stewardship
  - Creates a Nutrient Research and Education Council (NREC) - 9 voting members representing the fertilizer industry, grower organizations, environmental organizations, Director of Agriculture, and the Director of the Illinois Environmental Protection Agency
  - Funded by a fertilizer tonnage tax
  - "Keep it for the Crop" initiative, which is supported by a coalition of agricultural and environmental organizations
  - KIC 2025 - Implement 4R program and measure BMP adoption in key watersheds

KIC 2025
Keep It for the Crop by 2025

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Illinois Priority Watersheds to *Reduce Nutrient Loss*

nutrient stewardship

KIC 2025
Keep It for the Crop by 2025

States Supporting 4R Program

- Ohio Agribusiness Association
  - Working to include 4R in state nutrient use strategy
  - Outreach to various stakeholders has lead to Ohio Gov. office, OH EPA, and OH Dept. of Ag publically endorsing 4R

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Columbus, OH 43216-1049
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James Zehringer, Director
2045 Morse Rd.
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www.dnr.state.oh.us

Ohio Department of Agriculture
David T. Daniels, Director
8995 East Main Street
Reynoldsburg, OH 43068
www.agri.ohio.gov

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FOR IMMEDIATE RELEASE
Thursday, March 15, 2012

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ODNR, ODA AND OEPA MAKE WATER QUALITY RECOMMENDATIONS

Awareness and Additional Research Needed, 4R Nutrient Management Encouraged

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cing excess

COLUMBUS – The Ohio Department of Natural Resources, the Ohio Department of Agriculture and the Ohio Environmental Protection Agency today announced their recommendations for *reducing excess* agricultural nutrients from affecting or entering the western basin of Lake Erie.

holders and

"There is no question that there are a variety of factors that are contributing to the increased frequency of harmful algal blooms in Lake Erie, and many of Ohio's other streams and water resources," said Scott Nally, director of the Ohio EPA. "Ohio's agricultural community is not being singled out. With that being said, fertilizer is a contributing source to the problem and that's why we felt the need to direct the ag communities' attention to this problem and then take action."

"Our agencies worked with Ohio's agricultural community to identify the best ways to decrease this nutrient loading into Ohio's water bodies," said David Daniels, director of the ODA. "The farmers, private companies, agricultural organizations, agri-businesses, environmental organizations and academic institutions were all asked to provide their best input, ideas, advice and guidance. That was the

The report establishes the following key recommendations for action by ODNR, ODA and OEPA:

- Promote the voluntary "4R Nutrient Stewardship," which encourages farmers to use the right fertilizer source, at the right rate, at the right time and with the right placement;
- Utilize a three-tiered, statewide structure for prioritizing the implementation of any recommendations, based upon the condition of any given watershed in Ohio;
- Coordinate research and align funding streams;
- Coordinate programmatic funding within OEPA and ODNR;
- Coordinate communication and outreach effort to farmers;
  - Clarify the authority of ODNR to aggressively pursue habitual bad actors; and
  - Expand ODNR's authority to development Nutrient Management Plans.

States Supporting 4R Program

- Ohio Agribusiness Association
  - Working to include 4R in state nutrient use strategy
  - Outreach to various stakeholders has lead to Ohio Gov. office, OH EPA, and OH Dept. of Ag publically endorsing 4R
- Florida Chemical Fertilizer Association
  - Help bring 4R message to state agencies
- South Dakota Agribusiness Association
  - Utilizing education and outreach materials
  - Obtain feedback on additional needs and material use

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Thank You
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